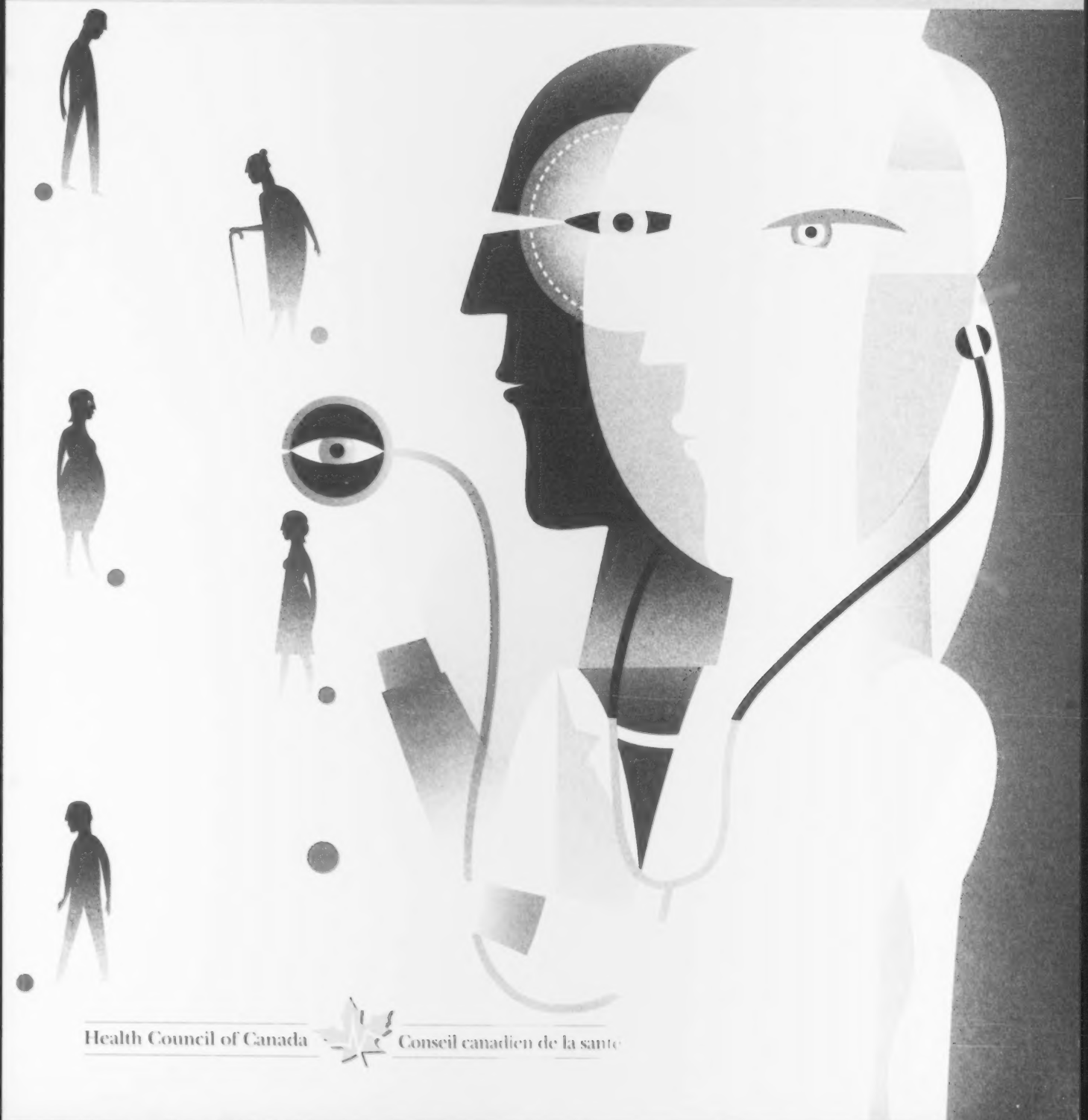
SEPTEMBER 2010

Decisions, Decisions:

Family Doctors as Gatekeepers to Prescription Drugs and Diagnostic Imaging in Canada



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Foreword

As Canada's population ages and more and more Canadians live with chronic conditions, the use of Canada's universal, publicly-funded health care system increases. In our 2009 discussion paper, *Value for Money: Making Canadian Health Care Stronger*, we found that this increased use – among other factors – had caused health care spending to double over the last decade, reaching an all-time high of $183 billion in 2009.

As a result, we set out to better understand three major drivers of this use – physician services, prescription drugs, and diagnostic imaging – and the relationships among these drivers. We consulted researchers, experts, and government officials in the fields of physician services, pharmaceuticals, and diagnostic imaging. We also turned to other national organizations – noted in the acknowledgements section – for their data and expertise.

In this report, we discuss the role of family physicians as *gatekeepers* in the use of prescription drugs and diagnostic imaging, since they are often the first point of contact for Canadians, and their decisions directly impact which specific health care services are used. In particular, we set out to identify the main factors – including the available tools and resources – that influence these physician decisions and ensure that health services are safe and appropriate, an objective shared by all Canadians who are interested in better medicine and ensuring a sustainable health care system.

We hope that this paper informs you, and encourages you to look at our health care system in a new way.

Sincerely,
John G. Abbott
CEO, Health Council of Canada

Executive Summary

Family physicians (commonly referred to as family doctors) are the first point of contact with the health care system for many Canadians. As a result, their decisions, such as which drug to prescribe or diagnostic test to order, affect not only treatment and health outcomes, but how the health system as a whole is used. For this reason, family physicians are often referred to as *gatekeepers* to Canada's health care system.

In this report, we examine the role of the family physician in the use of two areas of health services – prescription drugs and diagnostic imaging – and explore the factors that affect their decision-making.

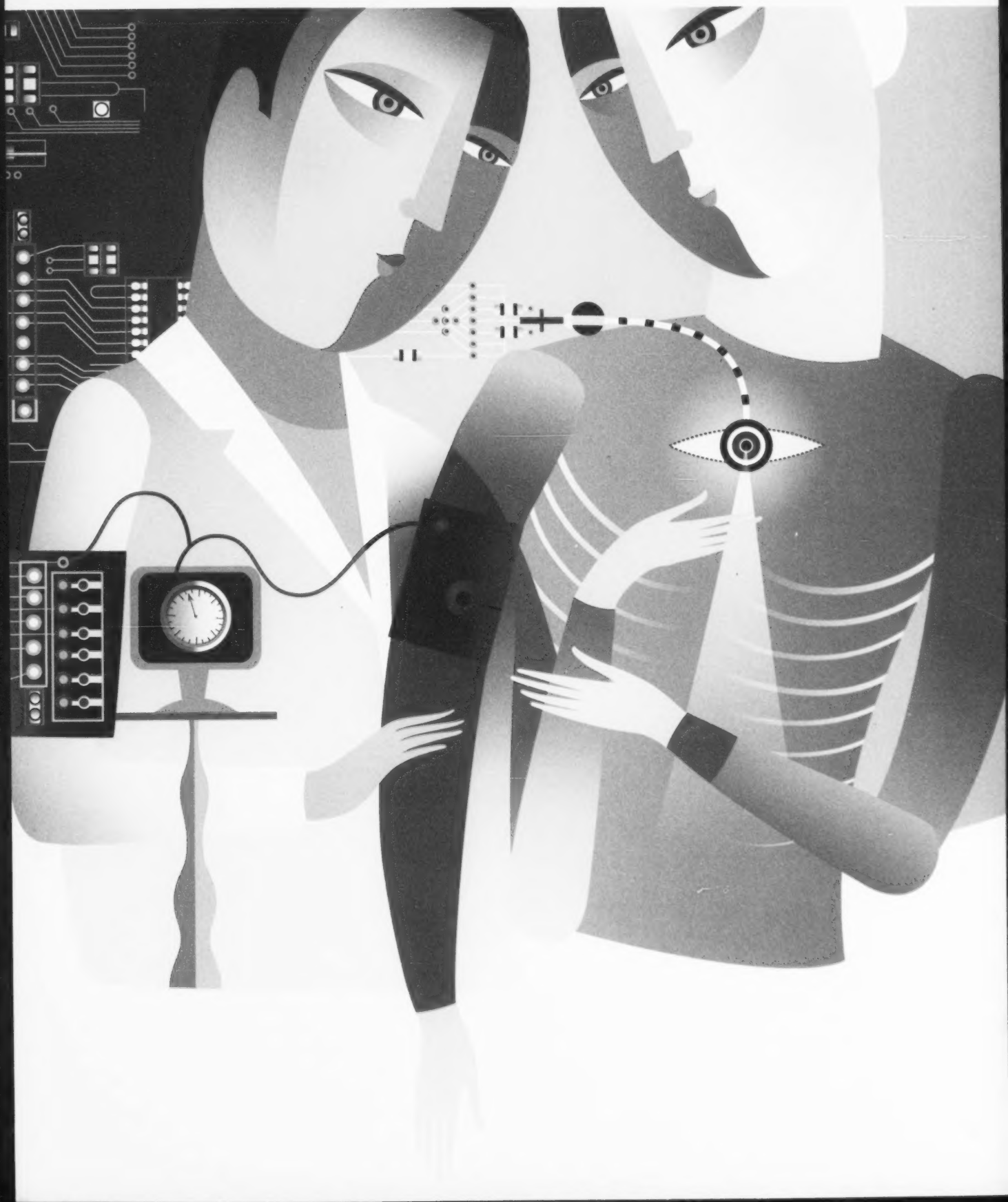
The questions we aim to address are:

- What are the recent trends for prescription drugs and diagnostic imaging?
- What are the main factors that influence a physician's decision to write a prescription or order a diagnostic test?
- What tools and resources do family physicians use to guide their decision-making? Are there areas for improvement in access to and use of these tools?

This report answers these questions through an analysis of the available data, a review of the literature and public reports on these topics, and an assessment of the opinions of leaders and experts in these fields. We also draw on the results of surveys of Canadians who have used the health care system and physicians who practice in Canada as described in the *Data Sources* section of this report.

OUR FINDINGS

The Health Council of Canada is unable to conclusively determine if the use of family physician services has increased, decreased or remained stable over the past decade, despite a rise in the number of practising family physicians in Canada. This is due to the growing variety of physician practice models across the country and the way data are collected, (or not) to reflect the services provided. For example,



in the past, family physicians generally worked in private practice and were paid on a fee-for-service basis; now more and more they are becoming part of primary health care teams in their communities where payment models are varied.

We do know, however, that the number of prescriptions written and the number of diagnostic tests ordered by family physicians are on the increase. From a health systems perspective, increased prescribing is driven by Canada's aging population – with many seniors living with chronic conditions. Yet across the provinces and territories, there is variation in drug utilization apart from an aging population. Coincidentally, government investments to improve access to diagnostic imaging and reduce wait times have allowed for increased use of diagnostic imaging, some of which may be considered over-use.

The factors that influence a family physician's decision to prescribe a particular drug, order a diagnostic test, refer to a specialist, or follow another course of action are numerous and complex. They include the physician's initial medical training and efforts to stay on top of current research, the availability of new drugs and technologies, new models of compensation, and the desire to meet patients' expectations.

Recently, through their own investments and those made by the provinces, territories, and Canada Health Infoway, physicians are beginning to use electronic medical records and other health information systems and clinical decision-support tools in their practices. It is widely known, however, that access to and use of these systems by family physicians is not as common in Canada as in other countries.

Our review of utilization data and research findings suggest that appropriateness of treatment – the family physician ordering the right drug or test for the right patient in the right situation – is an area for vigilance. We found room for improvement in the development and use of clinical practice guidelines in the ordering of prescription drugs and diagnostic tests, among other areas of physician decision-making. To achieve this, family physicians will need greater access to decision-support tools, including electronic medical-record systems. We know that Canada will need to make further investments to catch up with other countries in these areas.

The factors that influence a physician's decision to prescribe a particular drug, order a diagnostic test, or follow another course of action are numerous and complex.

MOVING FORWARD

Our research points to inappropriate prescribing of drugs and over-use of diagnostic imaging, although it is difficult to say why and by how much. Moving forward, we need to be mindful of these patterns and how they can be prevented. Health technology assessments, performance standards, and clinical decision-support tools, including evidence-based clinical practice guidelines, need to be made commonplace, and providers and payers held accountable for their decisions in the interest of good medicine and cost-effective care.

If there is no change in how family physicians are supported in their role as gatekeeper, we can expect a surge in health service use as the population ages, chronic diseases become more prevalent, new drugs and technologies are introduced, and patient and provider expectations expand. The availability of new drugs and technologies gives family physicians an ever-expanding list of treatments and tests. It is more critical than ever that clinical decision supports are in place to assist family physicians in making the best decisions – both for their patients and the long-term sustainability of our publicly-funded health care system.

As we conclude this initial exploration into the role of family physicians as gatekeepers and the factors that influence their clinical decisions, the main area where we lack necessary information is in creating a link between treatment decisions and patient health outcomes. While we know Canadians generally are living longer while managing ever-increasing chronic health conditions, there are also emerging issues around patient safety and quality of care that arise from inappropriate prescribing or over-use of diagnostic imaging.

Finally, in what the Health Council took to be a straightforward examination of the use of health services in Canada, we found that there is a shortage of quality comparable data and related research from which to analyze utilization patterns and draw meaningful conclusions about how health outcomes are changing. We believe there is a need to enhance data collection and analysis across the board. As well, an opportunity exists for more research on the issues raised in this report, as we have only scratched the surface. In short, it is very important that governments, health care providers and their professional associations, consider the means by which we can achieve optimal use of our health services. There is much work to be done – and we offer our report as a start.

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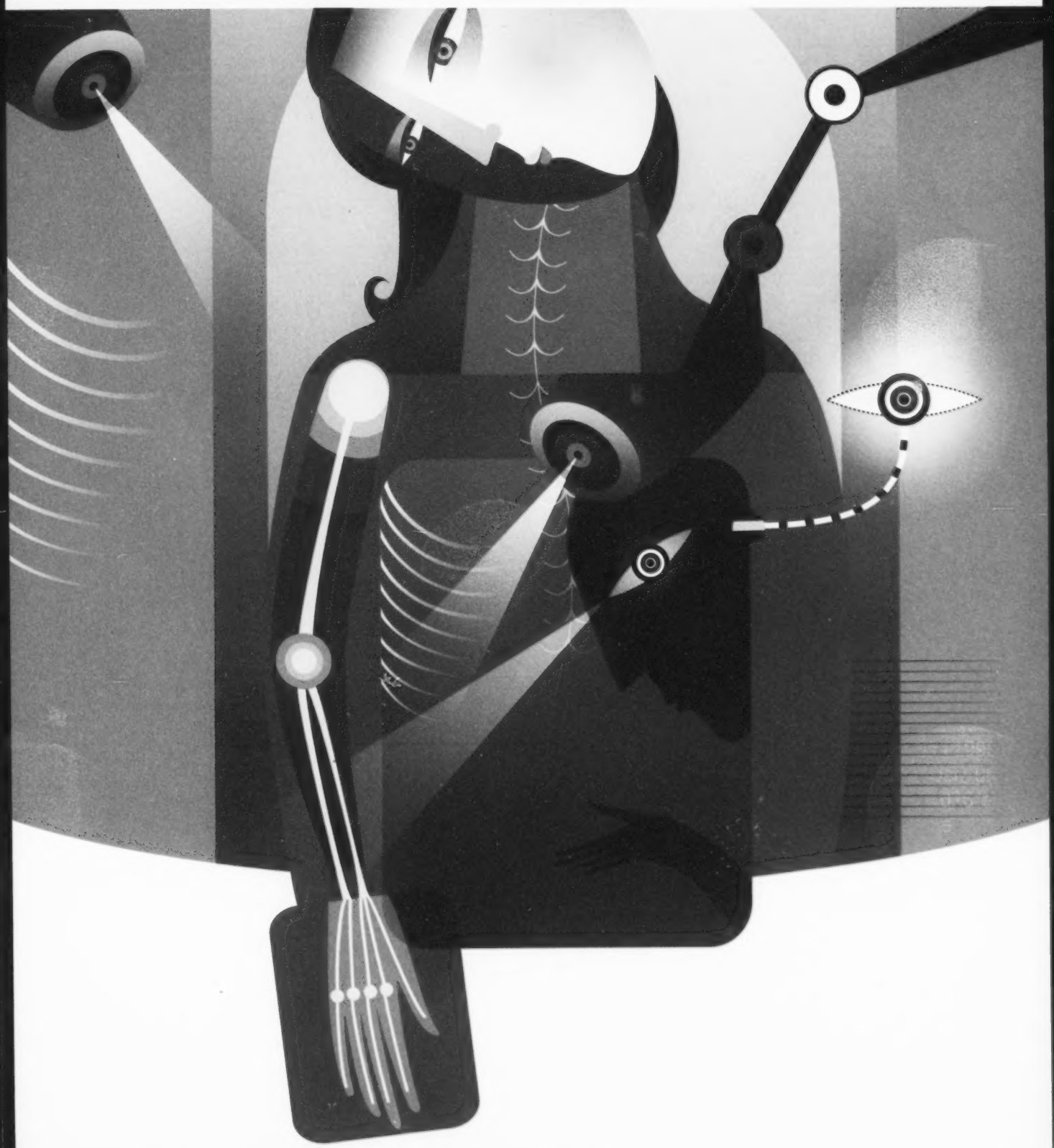


Rx

A Focus on Family Physicians

A. FAMILY PHYSICIANS AS GATEKEEPERS

Family physicians are the first point of contact with the health care system for many Canadians. Where they are part of a primary health care team, family physicians focus on medical diagnosis and management. Other health professionals – such as nurses, dieticians, and social workers – work with patients to help them improve their health habits and manage their health conditions. Physicians' decisions affect not only their patients' treatment and health, but also the health system as a whole. When doctors prescribe a drug, order a diagnostic test, or refer a patient to another health care provider, their decisions affect overall health care use and spending.

Studies have found that strong primary health care systems generate significant cost savings and improved patient outcomes.[1,2] With their broad perspective on a patient's health, family physicians are able to match individual needs to appropriate health care services. In this report, we focus on the factors associated with physicians' decisions related to prescription drugs and diagnostic imaging.

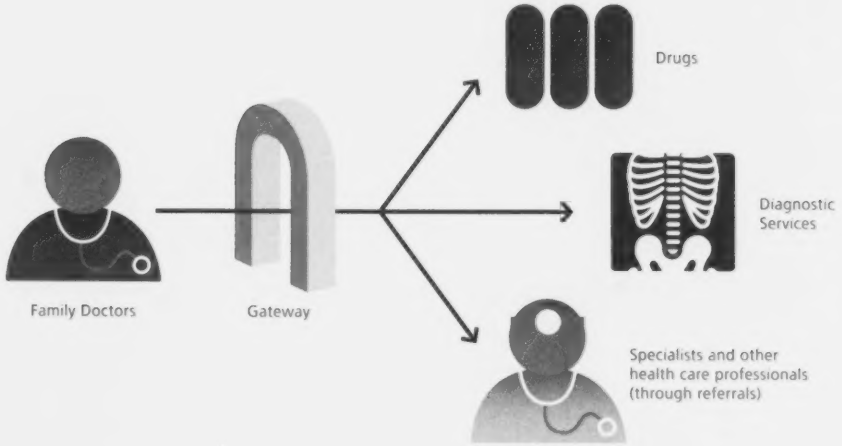
Because of their decision-making authority over access to many other health care services, family physicians have been referred to as gatekeepers. (Figure 1) The concept isn't unique to Canada as this is seen to be an effective way to control the use of health services without compromising the quality of care. In roughly half of the Organisation for Economic Co-operation and Development (OECD) countries, patients are required to be referred by a primary care physician in order to access specialized care.[3]

B. INCREASING COMPLEXITY OF CARE

As the health care system evolves to serve the changing needs of Canadians, so does the family physician's role as gatekeeper:

- Caring for aging patients, many with chronic conditions, is an increasing part of the family doctor's workload.
- Compounding this trend is the shift away from hospital-based care following treatment or surgery, which has had a major impact on the role of family physicians in Canada. Patients today tend to be discharged from hospital more rapidly than in the past. This transfers some of the remainder of the patient's care, such as prescription management and follow-up tests, to the family physician.
- In addition, family doctors now play a larger role in the use of diagnostic imaging, such as MRI and CT scans. It used to be that only specialist physicians could order sophisticated diagnostic imaging procedures. But as CT and MRI scans are becoming more common and accessible screening tools, some jurisdictions now accept orders for these tests from family physicians.

FIGURE 1
Family Physicians as Gatekeepers
The decisions made by family physicians open the door to a variety of health care services and resources.



When looking at common reasons for visits to physicians, many of which are related to chronic conditions, we found that patients often leave their doctor's office with a prescription, drug sample, or recommendation for an over-the-counter drug. (Figure 2) Family physicians are expected to be knowledgeable about guidelines for the appropriate and safe use of these medications and to monitor their patients carefully. For example, touching on some commonly prescribed medications, many cholesterol-reducing drugs require blood work to confirm that the drugs are working. People on blood thinners often need regular blood tests and dosage adjustments to maintain a careful balance between preventing blood clots and the risk of potentially serious side effects if their blood becomes too thin. Antidepressants may also require repeat appointments until the dosage is comfortable, effective, and safe.

Not only have their patients' needs become more complex, but the availability of new drugs and technologies gives family doctors an ever-expanding list of treatments and tests. Add to this a proliferation of information and advice directed at clinicians (and patients), aimed to influence their use of health services – and the importance of good decision-making becomes clear. Family doctors are providing care in an increasingly complex environment, meeting new challenges and needing new supports to assist them in their critical role.

C. FACTORS THAT INFLUENCE DECISION-MAKING

For this report, we define an *appropriate* decision as one that ensures a patient receives quality care in a timely manner and that reduces unnecessary costs to the health care system.

It is important to understand what influences physician decision-making, to ensure that resources and tools are made available to help physicians make appropriate and cost-effective choices that lead to the best possible care.

FIGURE 2

Many Leave with a Drug Recommendation

Many patients who went to their doctor for one of the top reasons for visits in 2009, left with a prescription, a drug sample, or advice to use over-the-counter drugs.

Top reasons for physician visits (including specialists)	Number of visits	% of visits with drug recommendations
Hypertension	20,658,000	81
General medical exam and health check up	10,492,000	2
Diabetes without complications	9,747,000	69
Depression	8,581,000	82
Anxiety	6,366,000	61
Acute upper respiratory infection	6,296,000	39
Normal pregnancy supervision	4,955,000	11
Hyperlipidemia (high cholesterol)	4,748,000	85

Source: IMS Health, Canada, Canadian Disease and Therapeutic Index (2009)

In a rapidly changing clinical environment, family physicians cannot rely on their medical school training alone to deliver top-quality care.

Medical decision-making is a complex topic, one that cannot be fully covered by this report. This section is intended to illustrate the complex decisions faced by family physicians, and to highlight some of the factors that influence how they make those decisions. As will become clear, family doctors face a challenging decision-making environment, and there is considerable room for improvement in the supports available to help them make the best possible decisions.

Medical school training

Lessons learned in medical school and clinical residency may have the greatest influence on a physician's decision-making. In Canada, these programs last five to seven years for family physicians and provide a world-class medical education. However, this training can become outdated as quickly as three to four years after graduation, due to advances in medical research and the introduction of new techniques, drugs, and tests.[4] In a rapidly changing clinical environment, family physicians cannot rely on their medical school training alone to deliver top-quality care.

Medical research

The volume of medical research produced each year is staggering. It has been estimated that physicians might need to read up to 20 articles a day to simply keep up with new publications in their field.[4]

Continuing medical education

To stay on top of new medical research and best practice recommendations, family physicians in Canada are required to update their skills through the College of Family Physicians of Canada's Maintenance of Proficiency Continuing Education Program. Continuing medical education has been found to be moderately effective at transferring knowledge to physicians, although its impact on practice patterns is weaker.[5]

Peer consultations

A number of studies have found that physicians frequently rely on conversations with fellow doctors to help guide their decision-making.[6,7] While consulting colleagues may be a quick source of information, there is no guarantee that colleagues will base their opinions on the best evidence.

Patient expectations

Taking a patient's desires, beliefs, and capabilities into account is an important element of patient-centred care. As a result, family physicians may select one treatment over another because it is more popular with their patients.[7]

"There is absolutely no comparison between the time it took to care for someone with a chronic condition 20 years ago and now. A big chunk of that is related to monitoring their drug treatment. I probably see 20-35% fewer patients per day than I did 20 years ago because of this."

Family physician, Nova Scotia, 2010

Patient expectations have been rising in recent years, partly due to easy access to health information on the Internet. A 2005 Statistics Canada survey found that over one-third of adults used the web to search for health information and many brought the information that they found to the attention of their family doctor.[8] While this additional information could be helpful to patients, it may also be outdated, incomplete, or misleading.

Time pressures

Canadian family physicians spend roughly two-thirds of their time on direct patient care, according to the *2007 National Physician Survey*. The remainder is spent on activities such as managing their practice, participating in research projects, teaching, and continuing medical education. These multiple demands are squeezing the amount of time doctors spend with patients which one Ontario study found to be roughly 10 to 15 minutes per visit.[9] There are indications that some physicians have responded to time pressures by imposing a "one problem per visit" policy.[10,11]

Physician compensation

Jurisdictions are experimenting with a number of physician compensation models, including incentives such as pay-for-performance. Recent research has found mixed results as to whether the way doctors are paid influences their decision-making. Close to two-thirds of Canadian physicians report receiving incentive payments, according to a recent survey, largely to enable them to spend more time with patients with chronic illnesses or other complex needs (see sidebar, *How Doctors are Paid*).

HOW DOCTORS ARE PAID: DOES IT AFFECT DECISION-MAKING?

Current evidence does not support a best physician payment model, however, a blended model appears to mitigate some of the challenges that may be associated with incentives in payment models such as fee-for-service, salary, and capitation.[12]

In Canada, most family physicians are paid through fee-for-service arrangements. However, a comparison of data from the *2007 National Physician Survey* and a previous version of the survey indicates that the percentage who say they prefer fee-for-service as their main source of income has been declining – from 50% in 1995[13] to 21% in 2007.

As a result, alternative payment models such as salaries and capitation (payment of a flat fee per patient), have grown increasingly popular among Canadian physicians. Between 2000 and 2006, the proportion of family physicians receiving at least some income from alternative payment models rose from 28% to 39%;[14] and in 2008, 27% of clinical payments to family physicians in eight provinces were through alternative payment models.[15] Alternative payment models are expected to reduce the pressure on family physicians to deliver high volumes of care, as well as provide incentives for preventive medicine and reduce time spent on billing and administrative paperwork.

In addition to their main payment methods, physicians are sometimes offered extra incentives for achieving specific clinical or performance outcomes or using decision-support tools. For example, in Ontario, pay-for-performance incentives are in place for physicians to achieve pre-determined targets for improving immunization and screening rates,[16] and providing enhanced after-hours access.[17] In Manitoba, Quality Based Incentive Funding provides funds to Physician Integrated Network clinics for meeting quality targets on specific clinical process indicators.[18] There are also financial incentives offered in British Columbia for adhering to clinical practice guidelines for some chronic conditions.[19]

The *2009 Commonwealth Fund International Health Policy Survey* found that 63% of Canadian physicians received financial support or incentives of some kind in addition to their standard professional income. The bulk of these incentives – 54% – was paid to physicians managing patients with chronic diseases or complex needs. The survey found that 26% of Canadian physicians received incentives for preventive care activities, 21% for meeting clinical care targets, and 1% on the basis of patient satisfaction.

Studies have drawn mixed conclusions on the effectiveness of pay-for-performance on health outcomes. Even for those that found a positive effect, it tended to be small in size.[20, 21] Globally, the largest national pay-for-performance scheme was the UK's 2004 Quality and Outcomes Framework, which covered 99.6% of family physicians and made up 25% of their income. A detailed evaluation of the scheme found it had no significant impact on the overall quality of care.[22] Despite the intuitive appeal of linking payment to performance targets, studies suggest potential problems, including physicians taking advantage of the system,[20, 21] friction among teams,[23] and decreased continuity of care.[22]

In the role of gatekeeper, physicians make numerous decisions on a daily basis that affect the lives of Canadians and the use of health services.

IN SUMMARY

In the role of gatekeeper, physicians make numerous decisions on a daily basis that affect the lives of Canadians and the use of health services. This role is becoming increasingly complex as many Canadians are living with chronic conditions and are in need of advice on aging-related health issues. This, combined with a move away from hospital-based care, is driving increased demand on family physicians' time and skills.

The factors that influence a family physician's decision to prescribe a particular drug, order a diagnostic test, refer to a specialist, or follow another course of action are numerous and complex. They include their initial medical training as well as their ability to stay on top of current research and best practices, their expanding expertise, the availability of new drugs and technologies, models of compensation, and the desire to meet their patients' expectations.

The traditional fee-for-service payment model provided billing information that provided a record of the services delivered by physicians. As doctors switch to alternative payment models the amount of billing data is reduced. No new data sources are available to fill the gap. Given that studies have drawn mixed conclusions on the effectiveness of pay-for-performance on health outcomes, and knowing that changing compensation models have led to a loss of data, it will be important for researchers and others to monitor the impact of changing physician compensation models on use of their services and overall health outcomes.

A Focus on Prescription Drugs

A. PRESCRIPTIONS IN CANADA

Canadians are filling more prescriptions than ever and many of the prescriptions for the most common drugs are written by family doctors. This has an impact on physicians' time and decision-making.

Based on estimates from national drug databases, the number of prescriptions filled at community pharmacies has increased by almost 80% in the past 10 years – from 272 million in 1999 to 483 million in 2009. (Figure 3)

Results of the 2007 Commonwealth Fund survey suggest that roughly half of all Canadian adults take at least one prescription drug. This is not surprising, given that more than one-third of Canadian adults report having at least one of seven common chronic health conditions – arthritis, cancer, chronic obstructive pulmonary disease (COPD), diabetes, heart disease, high blood pressure, and mood disorders including depression.

Medications are often a core strategy to manage these conditions and to prevent the development of complications or additional health problems. For example, a patient with diabetes might also be prescribed medications to help reduce the possibility of developing heart disease, the leading cause of death among people with diabetes.

As illustrated in Figure 4, the type and number of drugs prescribed vary over the lifespan, as the health and medication needs of Canadians change with age. In a recent analysis of prescriptions for seniors, the Canadian Institute for Health Information (CIHI) found that an estimated two-thirds of Canadians over age 65 took five or more prescribed medications.[24]

This pattern of prescription drug use supports the fact that drug spending outside of hospitals has been among the fastest-growing component of health care spending in Canada.[25] This growth is believed to stem back to the late 1980s and early 1990s, when governments were restructuring the health system with a particular focus on downsizing hospitals, shortening the length of hospital stays, and conducting more surgical procedures on an outpatient basis. At the same time, this was an era of rapid pharmaceutical innovation, resulting in a number of new medications that helped to make restructuring more feasible.[26]

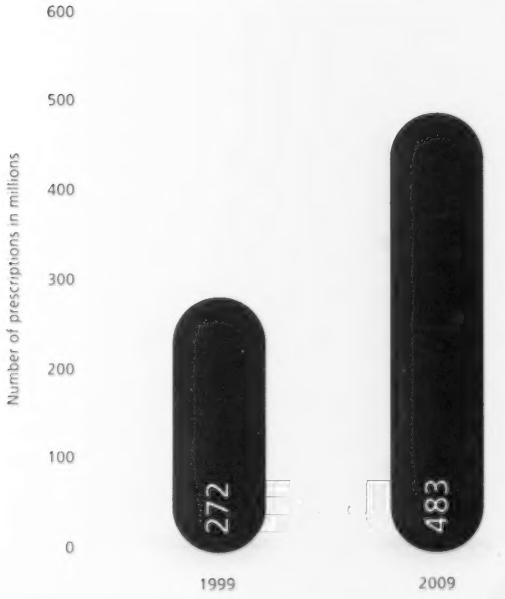
New influences may be shifting the cost curve, however. Although Canadians are filling more prescriptions, spending on prescribed drugs was forecast to grow 5.6% in 2009, the smallest rise in 10 years.[25] Recent changes in generic drug pricing should also help reduce overall costs.

B. A CLOSER LOOK AT SOME COMMONLY PRESCRIBED DRUGS

A look at the growth of three commonly prescribed types of drugs over the last five years helps to illustrate the expanding role of family physicians in prescribing. (Figure 5)

Based on projections from IMS Health's national drug databases (as described in the *Data Sources* section), the following estimates can be made about the number of prescriptions filled at retail pharmacies and the proportion of prescriptions written by family physicians:

FIGURE 3
Retail Prescriptions have Increased by 80% since 1999



Sources: IMS Health, Canada, Canadian CompuScript database (data extracts from 1999 and 2009)

Note: Excludes drugs dispensed in hospitals.

- In 2009, more than 74 million prescriptions for cardiovascular drugs were filled, up from 53 million in 2005. Drugs for cardiovascular-related conditions such as high blood pressure and irregular heartbeat are the single largest category in Canada.
- In 2009, nearly 32 million prescriptions for cholesterol-reducing drugs were filled, up from 20 million in 2005. Patients now typically begin treatment at a lower cholesterol level, resulting in more Canadians being recommended for this preventive therapy. In addition, several new cholesterol-reducing drugs were launched and heavily promoted during this time.
- Together, these two groups of drugs – plus diuretics, which are also used to prevent and manage cardiovascular disease – represented over 123 million prescriptions annually, or roughly one-quarter of all prescriptions dispensed in pharmacies in 2009. Family physicians wrote 80% of these prescriptions.
- In 2009, nearly 32 million prescriptions for antidepressants were filled, up from 23.4 million in 2005.

C. FACTORS AFFECTING PRESCRIBING DECISIONS

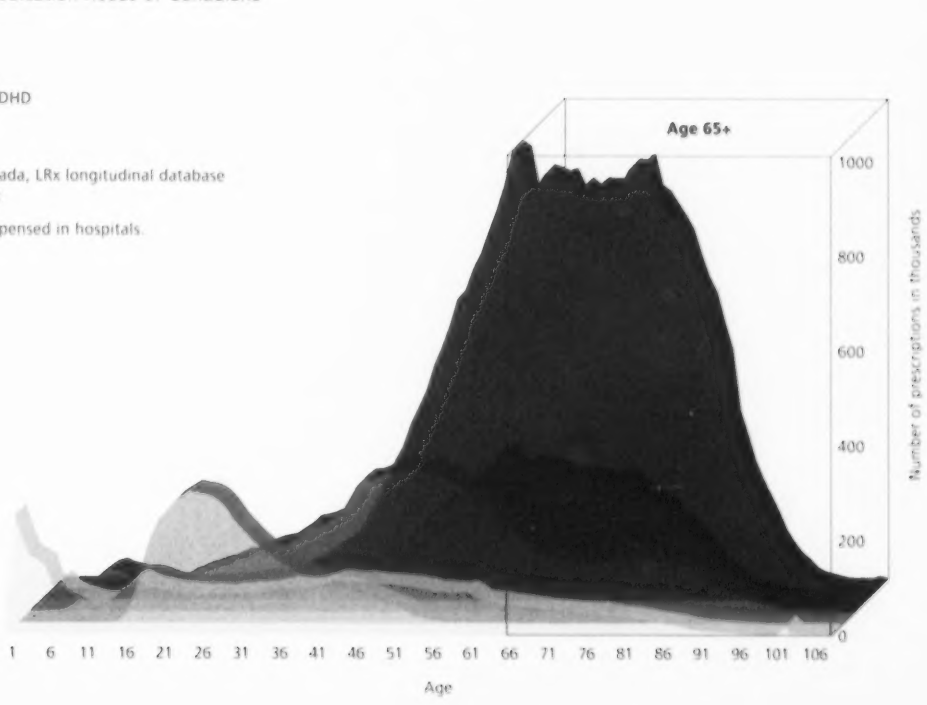
In the Health Council's 2007 background paper, *Optimal Prescribing and Medication Use in Canada: Challenges and Opportunities*, Ingrid Sketris and her co-authors found that most doctors have a set list of preferred drugs they regularly prescribe for certain conditions, influenced by their peers, opinion leaders, and group norms. Further research confirms that doctors' decisions about what to prescribe are affected by their knowledge, attitudes, and experiences with prescribing – as well as their knowledge of, and relationship with, the patient.[7]

It's a daunting task for any doctor to stay on top of the latest research about prescription drugs, as well as new or updated treatment guidelines. The sheer quantity of information and number of drugs to choose from can be overwhelming. In the last five years alone, there have been nearly 900 new drugs released on the Canadian market and promoted by drug companies. While many of these are newer versions of existing drugs, IMS Health estimates that almost 30% are described as "new chemical entities" – entirely new drugs.

FIGURE 4

Types of Drugs Prescribed Change with Age

The types of drugs prescribed vary over the lifespan, as the health and medication needs of Canadians change with age.



Source: IMS Health, Canada, LRx longitudinal database (data extract from 2007)

Note: Excludes drugs dispensed in hospitals.

Like other clinical decisions, prescribing decisions are influenced by a number of complex factors, some of which may be out of the hands of the family physician. For example, a specialist may write the initial prescription but the family doctor provides follow-up, prescription renewals, and monitoring of the medication use.

Information from pharmaceutical companies and academic detailing

Through *drug company detailing*, as the practice is called, prescribing decisions can be heavily influenced by the industry perspective. Representatives of pharmaceutical companies visit physicians and pharmacists in their offices or stores to educate them about drugs with the intent of influencing prescribing practices. Estimates suggest that about 6,000 drug representatives visit Canadian doctors on a regular basis, hoping to promote the use of their company's drug products.[27] Besides engaging busy doctors in brief pitches to promote their latest product, company representatives often hand out free samples of new drugs, hoping doctors will give them to a few patients and, later on, start prescribing the product more widely. While some of the drugs being touted are useful, many are just newer, more expensive versions of older drugs that are just as effective.[28]

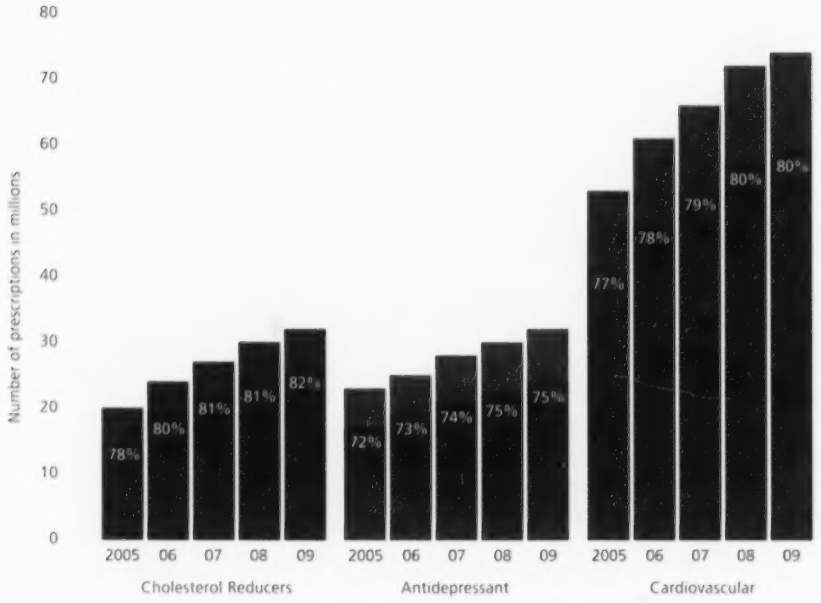
Academic detailing is an effective strategy for influencing the practices of health professionals[27,29] – governments hire individuals to provide unbiased education to physicians about the best evidence on the value of specific medications. The goal is not to promote a new drug, but rather to educate physicians about the best way to prescribe for their patients. These detailers inform doctors about how specific drugs should be used to safely and effectively improve treatment outcomes. They also provide information on drug prices, so physicians can make more cost-effective decisions for their patients.

In our *Optimal Prescribing and Medication Use* paper, we identified that academic detailing programs exist only on a modest scale in Canada, and recommended the expansion of these programs across the country.

FIGURE 5

Family Physicians Prescribing an Increased Proportion of Common Types of Drugs

The number of prescriptions for common drugs is increasing and family physicians are doing most of the prescribing.



Each bar reflects the total number of prescriptions per year. The shaded portion reflects the proportion prescribed by family physicians.

Sources: IMS Health, Canada, Canadian CompuScript database (data extract from 2005 to 2009), Canadian Drug Store and Hospital Purchases Audit (2005-2009)

"I'm flooded with information, most of it from drug companies. Earlier this year, new indications for treating [a particular condition] kept coming across my desk but I hadn't had time to make sense of them. My province funds an academic detailing program, and the same person visits me three to four times a year. Along with other information, I rely on her to give me key points about new recommendations so that I can understand and incorporate them into my practice."

Family physician,
Nova Scotia, 2010

Government formularies

Each province and territory, as well as the federal government, has a list of drugs that it will cover for residents who meet certain criteria (such as seniors, low income families, and people on social assistance). Formularies not only help governments manage their spending on prescription drugs; the lists can also influence prescribing. Governments may include a drug on the formulary with restrictions or conditions, in an attempt to make sure it is prescribed appropriately. For example, a provincial plan may cover a particular drug only for patients who have tried certain non-drug or other drug therapies for their condition.

Changes in the use of existing medications

Prescribing decisions can be influenced by new research or changes in practice guidelines that recommend new uses for an existing medication. Physicians themselves can influence prescribing trends through a practice known as *off-label* use – prescribing a drug for conditions for which it is not officially approved, but where there is some rationale for the drug's effectiveness.

D. ISSUES IN APPROPRIATE PRESCRIBING

With the growing use of prescription drugs in Canada, concerns arise as to whether all of these prescriptions are appropriate – that is, beneficial to patients and a cost-effective use of health care resources. Research suggests that some Canadians are getting drugs they don't need, while others are not receiving medication they could benefit from.[30, 31] Harmful reactions to drugs are a major safety concern, whether they are due to patients receiving an inappropriate prescription or taking the drug incorrectly.

Adverse drug reactions

Adverse drug reactions put thousands of Canadians in hospital every year, threatening their health and creating a cascade of unnecessary use of other health care services. A recent Canadian study found that 8% of emergency department visits were due to preventable medication problems.[32]

E. TOOLS TO GUIDE DECISION-MAKING

A tool that can help family physicians and community pharmacists to better prescribe and monitor the use of prescriptions is electronic prescribing (e-prescribing). To be effective, it has to be integrated into the patient's medical record and the province's drug information system. While there are notable advancements in these interrelated areas in Canada, we are still well behind other leading countries. We cannot expect to achieve our goals of improved health outcomes and a sustainable health care system if family physicians, who we rely on to be the gatekeepers of the system, don't have the appropriate tools to perform their role.

"The decision not to prescribe when it isn't warranted is one of the most courageous acts a physician can make. At the same time, the failure not to recognize the need for a prescription can be one of the costliest mistakes a physician can make."

Canadian pharmacy researcher, 2010

IN SUMMARY

The number of prescriptions filled at community pharmacies has nearly doubled since 1999. There are many factors that have contributed to this growth – the use of drugs to treat the growing prevalence of chronic disease, the increasing use of medications for disease prevention, the introduction of new drugs, and changes to treatment guidelines that expand the use of existing drugs. While these factors are intended to contribute to improved health outcomes for Canadians, they also lend to the complex environment in which physicians are making decisions. Added to this are other factors that influence individual physician's prescribing behaviour, including information from pharmaceutical companies and academic detailing, and government formularies.

To assist physicians with appropriate prescribing for safe and effective patient care, electronic decision-support tools and mechanisms for e-prescribing need to be in place, and resources need to be made available to our gatekeepers.

Inappropriate prescribing is a costly problem in terms of Canadians' health and the use of health care resources, but just how costly is impossible to say. Currently, Canada lacks a comprehensive system that can link prescriptions for specific types of conditions to outcomes, such as improved patient health or reduced hospitalization. Canada Health Infoway *(Infoway)*, along with the provinces and territories, is working to address this challenge through implementation of comprehensive drug information systems. In the absence of these information systems, individual studies of prescribing patterns or hospital admissions can only suggest the scope of the problem.

PRESCRIPTION DRUGS IN THE HEALTH ACCORDS

The National Pharmaceuticals Strategy (NPS) was established in 2004 to develop nationwide solutions to some of the concerns about the safety and affordability of prescription drugs in Canada. The strategy was part of the 2004 *10-Year Plan to Strengthen Health Care*, in which participating governments agreed to make a variety of improvements to their health care systems, paid for in part by the federal government.

The NPS was intended to:

- enhance action to influence the behaviour of health professionals prescribing drugs, so prescriptions are used only when needed and the appropriate drug is used for each situation;
- develop, assess, and cost options for catastrophic drug coverage to ensure that Canadians don't face undue financial hardship to pay for prescription medications, regardless of where they live (catastrophic refers to the impact on a person's finances, not his or her medical condition);
- find ways to increase access and reduce the costs of non-patented prescription drugs to governments and individual Canadians (see our June 2010 discussion paper, *Generic Drug Pricing and Access in Canada: What Are the Implications?*);
- improve patient safety by helping health care professionals provide the most appropriate and safest prescription for their patients, and by implementing electronic prescribing to reduce medication errors;
- improve the way medication use is monitored and evaluated after drugs are released into the Canadian market to ensure these drugs are safe for all individuals using them (an issue that will be addressed in our upcoming discussion paper on drug safety and effectiveness);
- ensure that all Canadians have access to the same prescription drugs through their government drug plans, regardless of where they live in Canada, based on a common national drug formulary; and
- provide faster access to new emerging drugs for unmet health needs.

In 2009, in our report, *The National Pharmaceuticals Strategy: A Prescription Unfilled*, the Council reviewed progress on the NPS and reported that it appeared to have stalled. The Council is aware of pharmaceutical reforms progressing in individual jurisdictions, and that a pan-Canadian purchasing alliance has recently been announced. At the September 2010 Conference of Provincial-Territorial Ministers of Health, ministers agreed to develop a pan-Canadian purchasing alliance allowing governments to pursue joint procurement of prescription drugs and medical supplies and equipment in an effort to drive value-for-money in health care spending.

A Focus on Diagnostic Imaging

A. THE GROWTH IN DIAGNOSTIC IMAGING IN CANADA

Diagnostic imaging, which began with the discovery of the X-ray in 1895, has transformed modern medicine, enabling more appropriate treatments for some patients, reducing the need for invasive surgeries in others, and helping many patients and their doctors assess the progress of treatment.

But even the visionaries of the 19th century couldn't have predicted the significant impact this technology would have on health care today. The technology and expertise required to take advantage of imaging tools have advanced quickly, improving the efficiency and precision of medical assessment – both important elements of high-quality care.

Governments have invested heavily in recent years to improve access to CT and MRI. As a result, the number and use of these machines have grown. While specialists have traditionally ordered the vast majority of MRI and CT scans, the role of family physicians in this area is growing as well.

Diagnostic Imaging at a Glance

MRI (magnetic resonance imaging) uses a powerful magnetic field and radio-frequency pulses to produce detailed pictures of virtually all internal body structures, including organs and soft tissue, with the exception of bone. A computer then reassembles the many resulting images, or slices, to provide a comprehensive image.

Exposure to radiation: none involved.

CT (computed tomography) combines X-rays with computer technology to produce a more detailed, cross-sectional image of the body. Doctors can see the size, shape, and position of structures deep inside the body.

Exposure to radiation: yes.

PET or PET/CT (positron emission tomography/computed tomography) is a type of nuclear-medicine imaging that uses small amounts of radioactive material, either injected, swallowed, or inhaled, which are then detected in the body by sophisticated cameras. In concert with computer technology, this technique can produce highly detailed images of both the structure and function of the elements of the body.

Exposure to radiation: yes.

FIGURE 6

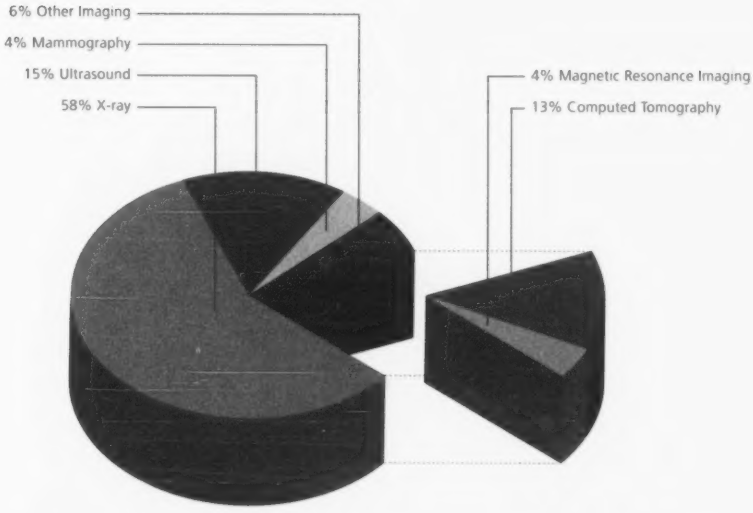
Distribution of Diagnostic Imaging Exams in Canadian Hospitals (excluding Quebec)

Nearly 80% of all medical imaging procedures in Canada are conducted using X-ray and ultrasound imaging technology a proportion in line with the World Health Organization's assessment that these two procedures can fill 80–90% of diagnostic imaging needs.[33]

Source: CIHI, Canadian MIS Database (2008-2009)

Notes: Examinations in Quebec hospitals are excluded as they are not reported according to the Standards for Management Information Systems in Canadian Health Services Organizations (MIS Standards).

Also excludes angiography studies.



B. INVESTMENTS RESULTING IN INCREASED ACCESS TO MRI AND CT

Over a five-year period from 2000 to 2005, $3 billion in federal funds were injected into the health system for investments related to diagnostic imaging. In 2000, the federal government provided $1 billion in funding for the purchase of medical diagnostic and treatment equipment by the provinces and territories. In 2003 and 2004, recognizing the health benefits to individual Canadians and the health system as a whole, the First Ministers, as part of their 2003 *Accord on Health Care Renewal* and subsequent *10-Year Plan to Strengthen Health Care*, agreed to make further investments of $2 billion to improve access, provide support for specialized training, and reduce wait times for Canadians.[34]

More scanners and more scans

As a result of the significant financial investments, both the number of scanners and number of exams performed in Canada have increased. Based on data from the CIHI *National Survey of Selected Medical Imaging Equipment* (see *Data Sources*), we are able to better understand access patterns at the provincial and territorial levels.

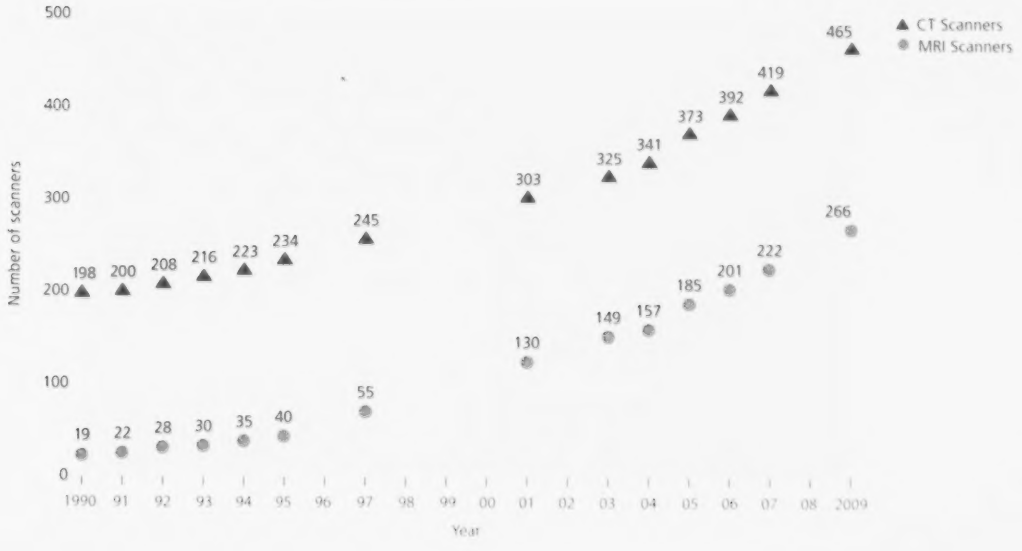
Between 1990 and 2009, the number of CT scanners in Canada more than doubled (from 198 to 465) and MRI scanners increased more than tenfold (from 19 to 266). (Figure 7) Accordingly, in 2009, Canadians received more than four million CT exams and nearly 1.4 million MRI exams – a 58% increase in CT exams and a 100% increase in MRI exams compared to 2003. This translates to a national rate of 121 CT exams and 41 MRI exams for every 1,000 Canadians in 2009, though the rate varied for each province and territory.

FIGURE 7

CT and MRI Scanners in Canada have Increased Considerably over the Last Two Decades

Sources: OECD Health Data (2007); National Inventory of Selected Imaging Equipment, Canadian Coordinating Office for Health Technology Assessment; National Survey of Selected Medical Imaging Equipment, supplemented from provincial ministries of health

Notes: The numbers of MRI and CT scanners in free-standing imaging facilities were imputed for years prior to 2003 based on data collected in the 2003 National Survey of Selected Medical Imaging Equipment. Inventories were not conducted annually. Data is not available for 1996, 1998-2000, 2002. Quebec data were incomplete for 2000; therefore, all 2000 data are excluded. The number of CT scanners in 2006 includes five scanners installed in 2003 and four scanners installed in 2004 but reported for the first time in the 2006 survey. The number of MRI scanners in 2006 includes two scanners installed in 2003 and two scanners installed in 2004 but reported for the first time in the 2006 survey. No adjustments were made to the 2004 and 2005 counts as the first year of operation of these scanners was undetermined.



As illustrated in Figures 8 and 9, the number of machines and intensity of use varies by province.

Despite the investments in diagnostic imaging, Canada ranks low, internationally, when compared to other OECD countries in terms of access and use of MRI and CT scanners. (Figure 10) That said, there are no benchmarks or standards for an appropriate number of scans per 1,000 population – so we don't know if this ranking is good or bad.

More machines on the way

In many parts of Canada, the presence of CT and MRI scanners has now become an essential component in attracting physicians, specialists, and especially recent medical graduates to hospitals, both urban and rural. Some jurisdictions are now looking to acquire the most advanced types of diagnostic imaging scanners, such as PET or PET/CT.

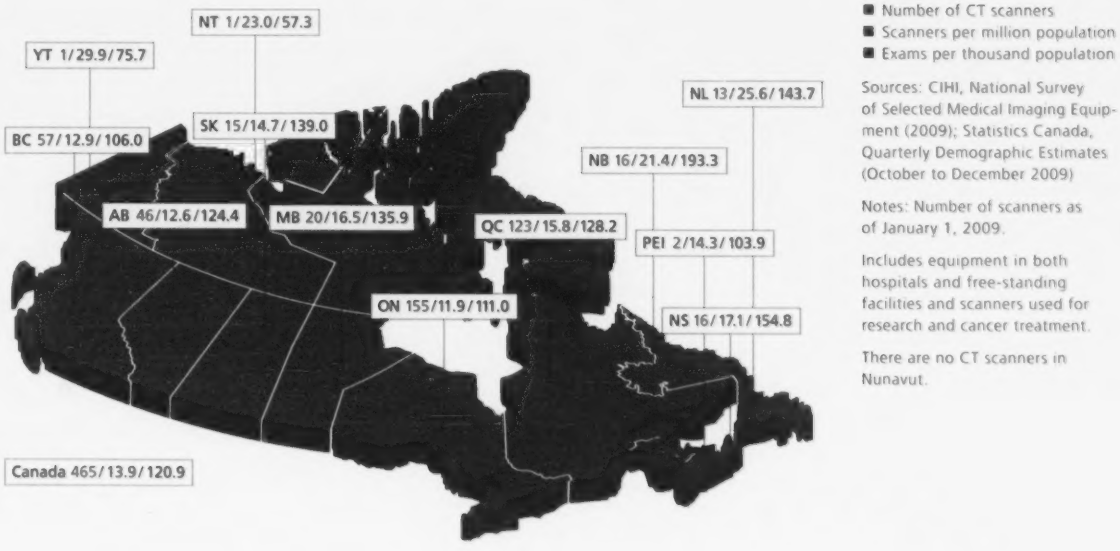
The hybrid PET/CT machine debuted in Canada in 2002 and, as of 2009, there were 29 of these advanced scanners nationwide. According to CIHI's *National Survey of Selected Medical Imaging Equipment*, Quebec and Ontario have 13 and nine of these machines, respectively; Alberta has three; and British Columbia, Manitoba, New Brunswick, and Nova Scotia each have one. In its 2010 budget, Newfoundland and Labrador provided planning funds for a new PET scanner at an appropriate site.[35]

To support its funding decisions to purchase additional machines, given the currently limited evidence of clinical outcomes, the Ontario Ministry of Health and Long-Term Care has established a PET evaluation program, in which interested hospitals must be involved in clinical trials to build a body of clinical knowledge and evidence.[36] As an alternative to purchasing more equipment, some governments are investing in technology that facilitates the sharing of diagnostic images among radiologists, family physicians, and specialists. For example, in PEI, the PACS (Picture Archiving and Communications System) connects all hospitals in the province, giving patients and providers easy access to the benefits of diagnostic imaging.[37] (see sidebar, *PACS*).

FIGURE 8

Distribution and Use of CT in Canada

The number of CT machines and intensity of use varies by population.


NT 1/23.0/57.3
YT 1/29.9/75.7
BC 57/12.9/106.0
SK 15/14.7/139.0
AB 46/12.6/124.4
MB 20/16.5/135.9
ON 155/11.9/111.0
QC 123/15.8/128.2
NL 13/25.6/143.7
NB 16/21.4/193.3
PEI 2/14.3/103.9
NS 16/17.1/154.8
Canada 465/13.9/120.9
Number of CT scanners
Scanners per million population
Exams per thousand population
Sources: CIHI, National Survey of Selected Medical Imaging Equipment (2009); Statistics Canada, Quarterly Demographic Estimates (October to December 2009)
Notes: Number of scanners as of January 1, 2009.
Includes equipment in both hospitals and free-standing facilities and scanners used for research and cancer treatment.
There are no CT scanners in Nunavut.

"What we think of as state of the art, for them (physicians) is standard of care...If we are going to attract the best and the brightest, we need to offer them the best–and right now that is an MRI."

Campaign co-chair,
Ontario 2008

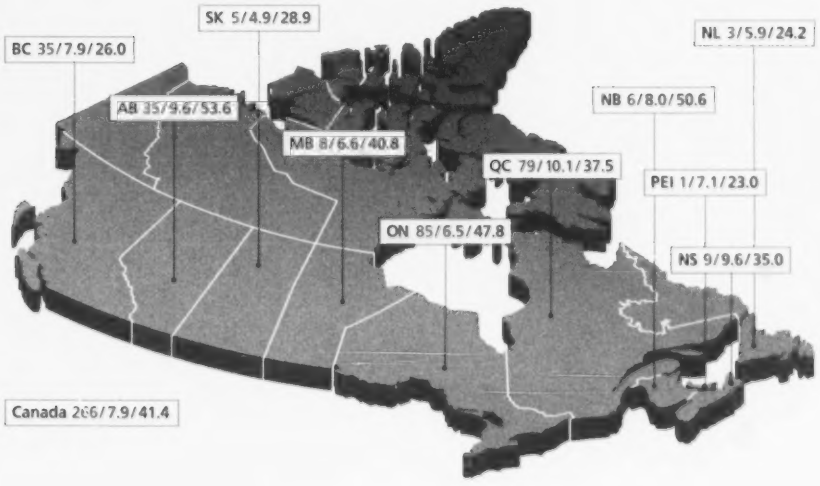
Health Technology Assessments

To assist in their decision-making, jurisdictions can undertake *Health Technology Assessments*. These assessments examine the broad impact of new health technologies from the perspective of patients (clinical effectiveness) and policy-makers (cost effectiveness) to reach a full evaluation of whether an innovative technology provides good value for money to Canada's health care system. Jurisdictions can either undertake those on their own or engage the Canadian Agency for Drugs and Technologies in Health (CADTH). CADTH is a government-funded, independent organization which provides impartial information to policy-makers about the clinical value and cost-effectiveness of new medical technologies, for example, the appropriate use of PET technology.

FIGURE 9

Distribution and Use of MRI in Canada

The number of MRI scanners and intensity of use varies by population.



- Number of MRI scanners
- Scanners per million population
- Exams per thousand population

Sources: CIHI, National Survey of Selected Medical Imaging Equipment (2009); Statistics Canada, Quarterly Demographic Estimates (October to December 2009)

Notes: Number of scanners as of January 1, 2009.

Includes equipment in both hospitals and free-standing facilities and scanners used for research and cancer treatment.

There are no MRI scanners in the territories.

PACS: Allowing Rapid and Efficient Transmission of Diagnostic Results

The Picture Archiving and Communications System (PACS) lets health care providers view X-ray, ultrasound, CT, and MRI scan images no matter where they are, expanding the reach of diagnostic imaging and helping providers get more timely information. This is done through digital storage and transmission of medical images.

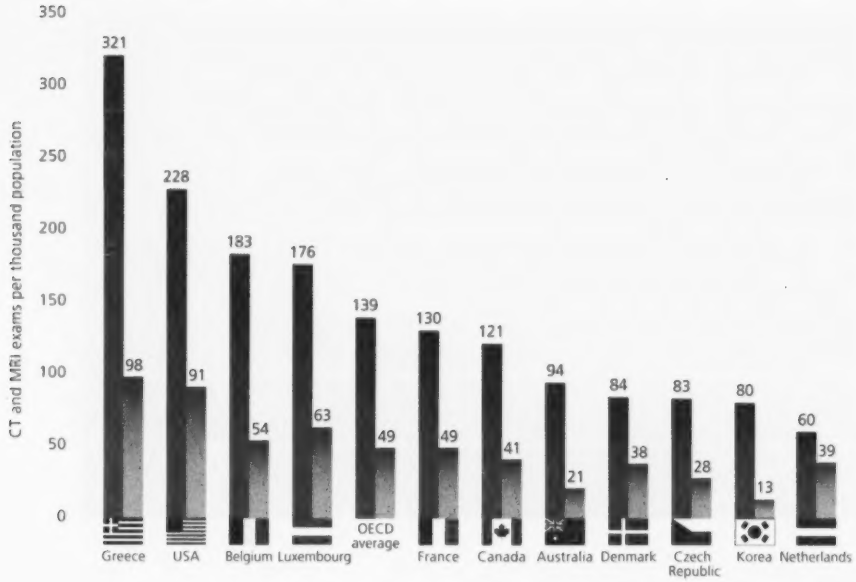
In recent years, there has been a great deal of progress in Canada in implementing PACS, accelerated through collaboration between *Infoway* and the provincial and territorial governments. Today, an estimated 90% of Canadian radiologists are using PACS.[38] This is based on the fact that most radiologists work out of large hospitals and Canada is 82% filmless in acute care hospitals.

PACS has the potential to dramatically change the way health care is delivered, particularly in rural and remote areas. A recent *Infoway* survey of referring physicians who used PACS found that over half of them saved from 30 to 90 minutes per week and reduced the number of patient transfers between facilities.[39] While these systems are expensive, *Infoway* estimates that, once fully implemented across the country, PACS will generate between $850 million and $1 billion a year in health system efficiencies through increased clinical productivity and reduced patient transfers, duplicate exams and film costs.

FIGURE 10

Rate of CT and MRI Scans Varies among Countries

Canada's rates of MRI and CT exams per 1,000 population fall in the middle of other Organisation for Economic and Co-operation and Development (OECD) countries.



Sources: OECD Health Data (2010); CIHI, National Survey of Selected Medical Imaging Equipment (2009); Statistics Canada, Quarterly Demographic Estimates (October to December 2009)

Note: Data for Australia include only exams for out-patients and private in-patients (excluding exams in public hospitals).

C. AUTHORITY FOR ORDERING TESTS IS CHANGING

Family physicians may be new to ordering specialized tests. When they were first introduced, MRIs and CT scanners were only available by referral from a specialist, such as a neurologist. Over time, as these advanced scanning machines have become more common, authority to order tests has been given to family physicians. A 2003 study found that in Ontario, 20% of MRI tests were ordered by family physicians.[40] Recent decisions in Manitoba and other jurisdictions also allow family physicians to order MRI and CT scans.[41] Today, a referral for these scans may be made by either a family physician or a specialist, depending on factors such as the policies of each health region or authority, geographic location of the ordering physician, availability of radiologists, and the medical reason for requesting the scan. In some jurisdictions, and within certain limitations, medical students or residents are permitted to request diagnostic imaging, as well as chiropractors and nurse practitioners.

For those family physicians who have recently been given authority to order scans, deciding which diagnostic test to use may be challenging if they have not received training in medical school or have no access to practice guidelines for ordering diagnostic imaging. Without this information, physicians may not be aware of a test's limitations, or that a more effective test is now available.[42]

The role of radiologists

Good communication between the referring physician and radiologist is essential, so they can agree on the most appropriate test and understand how the result will benefit the patient's diagnosis and/or treatment.

Radiologists – physician specialists trained in diagnostic imaging – play a key role in the access and use of diagnostic imaging. They work with other health care professionals to determine the appropriateness of a requested scan, provide quality control and supervision during the exam, and interpret and distribute the results.

The number of diagnostic radiology physicians and medical radiation technologists in Canada remained relatively stable between 1993 and 2006,[43] although the number of scanners grew rapidly in the same period. The Canadian Association of Radiologists (CAR) remains concerned about the increasing workload and the staffing levels needed to keep pace with the growth in the number of scanners. CAR notes that there is a lack of comprehensive data to guide future health care planning in this area.[41]

D. APPROPRIATE USE OF DIAGNOSTIC IMAGING

According to the Canadian Association of Radiologists, as many as 30% of CT scans and other imaging procedures are inappropriate or contribute no useful information.[44]

Some provincial studies have documented the problem:

- A government-commissioned literature review in Saskatchewan found that about 30%, and as much as 50%, of imaging exams were not based on sound evidence and were unlikely to contribute diagnostic information proportional to their cost and the radiation exposure for patients.[42]
- An Ontario study examined CT and MRI scans done on an outpatient basis and found as much as a 70-fold difference between hospitals in the number of scans ordered for specific problems. Many of the diagnostic scans did not produce clinically useful information. Less than 2% of CTs for headaches found abnormalities that explained the problem and, although 90% of MRIs for back pain found abnormalities, this information was not useful in planning treatments.[45]

In 2006, Dr. Robert Miller, then-President of CAR, noted the following "wasteful use of medical imaging":[46]

- About 5% of the imaging workload consists of duplicated tests, because the original has been lost or is not available when needed (as estimated by *Infoway).*
- Inappropriate ordering is a consequence of pressures put on referring physicians by patients and by an ever-increasing workload.
- Liability and malpractice concerns may drive physicians to order more tests than needed.

And once the test is ordered, it is likely to be done – regardless of appropriateness. A 2005 survey of Canadian MRI facilities found that only 42% had documented guidelines for prioritization in diagnostic imaging, and none had measures to ensure they were followed.[47] This may be related to the rapidly changing nature of diagnostic imaging, with standards for best practice that are constantly being updated.[48]

In response to these rapid changes, the CAR is currently expanding the clinical situations covered by its *Diagnostic Imaging Referral Guidelines: A Guide for Physicians*, and is studying compliance with imaging guidelines. Work is also underway in Ontario to facilitate appropriate ordering through the development of best practices and a process map for patients requiring an MRI or CT scan.

Inappropriate use of diagnostic imaging carries another concern – patient safety – particularly in relation to unnecessary exposure to radiation.

Implications for wait times

Responding to concerns about wait times for diagnostic imaging, the 2003 *First Ministers' Accord on Health Care Renewal* called for the development of indicators of timely access to CT and MRI scanning. This was followed in the 2004 10-*Year Plan to Strengthen Health Care* with a call for jurisdictions to work together to develop evidence-based benchmarks for medically acceptable wait times for diagnostic imaging procedures.

In consultation with medical experts and using the best evidence available, in 2005, the Wait Time Alliance for Timely Access to Health Care put forth benchmarks, or performance goals for diagnostic imaging. Recommended maximum wait times for CT and MRI exams range from "immediate to 24 hours" to "within seven days" to "within 30 days" based on the priority or urgency of the case.[49]

While these benchmarks have been proposed, it is difficult to determine where they have been achieved. In CIHI's 2010 reporting on wait times, it is noted that wait times for CT and MRI scans are difficult to compare, because only four provinces are currently providing information in a similar way. However, within those parameters, and using the period between April and September 2009, wait times data suggest that the typical patient waits longer for an MRI scan than for a CT exam, with a median range for CT wait times varying from seven days in PEI to 18 days in Nova Scotia. MRI wait times, over the same period, ranged from an average of 40 days in Ontario to 111 days in PEI.[50]

Implications for patient safety

Inappropriate use of diagnostic imaging carries another concern – patient safety – particularly in relation to unnecessary exposure to radiation.

While MRI testing does not expose the patient to radiation, CT and PET/CT scans involve exposure to ionizing radiation, with potentially harmful

side effects. Children are believed to be more anatomically sensitive to the effects of radiation exposure, so particular attention must be paid to their imaging care.

CAR's referral guide for physicians dedicates a section to pediatric radiology, providing guidelines for use with children in specific clinical situations.[51] In addition, CAR and other health care organizations formed an international coalition in 2006, the Alliance for Radiation Safety in Pediatric Imaging, to increase awareness of the need to adjust radiation dosages for children.

E. TOOLS TO GUIDE DECISION-MAKING

Regardless of who orders or supervises diagnostic tests, it is widely recognized that having a consistent set of tools available to assist with decision-making is essential. Organizations are working with the provinces to study appropriate use of diagnostic imaging and to develop and test tools to help guide physician decision-making.

Computer-assisted ordering

CAR first published *Diagnostic Imaging Referral Guidelines: A Guide for Physicians* in 2005. With support from the federal and Manitoba governments, CAR is testing a tool that incorporates these referral guidelines into a computerized order-entry system with decision support, so that consulting best-practice guidelines are integrated into the physician's workflow. When physicians request a diagnostic exam, the system links them with corresponding guidelines and prompts them as to whether their decision is appropriate. To date, CAR studies have been undertaken with specialists and family physicians. CAR is optimistic that this type of decision support will be valuable if it can be incorporated into the development of electronic health records to reinforce the optimal use of diagnostic imaging technology.

Best-practice guidelines for managing the flow of patients

In Ontario, the Ministry of Health and Long-Term Care developed a set of practice guidelines to improve timely access to CT and MRI scans, and began to require hospitals to collect information that will enable the hospitals to monitor and improve their scanning performances.[52] In addition, the Ministry developed an online decision-support tool for referring physicians, in collaboration with Toronto's University Health Network and St. Joseph's Healthcare Hamilton.[53] The decision-support tool asks the referring physician for the patient's symptoms and then recommends whether diagnostic imaging is appropriate and, if so, which scan should be performed.

IN SUMMARY

There were significant investments in diagnostic imaging beginning in 2000. This led to an increase in the number of machines in Canada and the number of scans provided to Canadians, though there is wide variation among the provinces and territories. Family physicians are taking on a larger role in ordering diagnostic tests. In order to ensure appropriate use, family physicians need to be current on the best uses of new technology and best practices for ordering tests, consulting with radiologists and other specialists as appropriate, and then providing relevant information back to patients.

Researchers and national organizations have identified concerns about inappropriate and over-use of diagnostic imaging and implications for patient safety. Unanswered questions about access, wait times and the benefit of family physicians ordering tests are areas for further research.

C6

Making Decisions Easier: Tools for Decision-Making

For family doctors, their patients' health and safety are the primary focus of health care decision-making. But as we've illustrated through a look at prescription drugs and diagnostic imaging, decisions by family physicians also affect the use of – and spending on – other health care services. A number of different tools exist to help physicians with their decision-making.

A. CLINICAL PRACTICE GUIDELINES

Clinical practice guidelines are "systematically-developed, evidence or consensus-based statements to assist care provider decision-making about the most appropriate health care to be provided for specific clinical circumstances."[54] They represent the accumulated findings of researchers and clinical experts, which are distilled into a set of rules or treatment strategies.

Clinical practice guidelines:[54]

- enhance the quality of care by informing providers about appropriate care;
- encourage the adoption of evidence-based practices;
- provide benchmarks by which practitioners and health systems can be held accountable for care delivered;
- help to reduce inappropriate variations in care across different geographical and clinical settings;
- offer the potential to empower patients, by providing them with information about appropriate and effective care; and
- can contribute to public policy goals, such as cost containment, by encouraging more appropriate decisions about the use of resources.

The 2009 Commonwealth Survey painted an encouraging picture about physician use of guidelines for chronic conditions. Canadian family physicians said they routinely used guidelines to treat diabetes (83%), asthma and COPD (77%), hypertension (82%), and, to a lesser extent, depression (45%).

Tools that incorporate best practice and referral guidelines into a computerized order-entry system are being tested and used by family physicians in some provinces.

These survey findings are encouraging, given that research studies suggest that there is a gap between the knowledge of medical evidence and practice guidelines and their use in clinical practice. Studies have shown that guideline adherence is low, and that active, multi-faceted interventions are often required to encourage providers to follow guidelines.[55]

Limited adherence may be due to concerns about the quality and objectivity of some guidelines,[56] or concerns about whether they are up-to-date.[57] Family physicians may also feel that guidelines are not appropriate for their patients if the guidelines provide advice for a single disease but do not account for the complexity of treating people with multiple chronic conditions.

Lack of uptake could also be related to access. However, the *2007 National Physician Survey* found that most family physicians (86%) reported good to excellent access to clinical practice guidelines.

A growing number of organizations are involved in the development and promotion of guidelines for family practice. At a national level, the Canadian Medical Association (CMA) hosts CMA Infobase, a website with over 1,200 guidelines that are accessible to the general public. The Centre for Effective Practice promotes the use of guidelines by reviewing and summarizing guidelines for conditions that are frequently managed in primary care. The Centre's website provides screening tools, patient education materials, and resources to support primary health care teams. Many more organizations operate at the provincial and territorial levels to encourage family physicians to apply guidelines. In June 2010, Ontario's *Excellent Care for All Act* gave the Ontario Health Quality Council an expanded mandate to make recommendations about guidelines. While there is much work underway, a challenge for Canadian health care providers is that, unlike the UK, there is no single national organization with official responsibility over the creation and dissemination of clinical practice guidelines.

"The most remarkable feature about 21st century medicine is that we hold it together with 19th century paperwork."

Tommy G. Thompson,
former US Secretary of Health
and Human Services

B. ELECTRONIC DECISION SUPPORT

Electronic decision-support systems are computerized tools that aim to improve patient care by putting best-practice recommendations directly onto computer and hand-held devices of physicians. Features might include up-to-date clinical practice guidelines, automated reminders for preventive screening, software that flags drug interactions, or guidelines for appropriate diagnostic imaging referrals.

By bringing such tools together with patient information at the time of decision-making, these systems have been shown to improve patient care,[58] management of chronic disease, adherence to best-practice guidelines, and appropriate prescribing. Greater use of electronic decision supports is also expected to result in significant health care savings, since the delivery of appropriate care will result in fewer adverse events and more effective treatment.[59]

As noted in the *Diagnostic Imaging* section of this report, tools that incorporate best practice and referral guidelines into a computerized order-entry system are being tested and used by family physicians in some provinces. The aim is to ensure that best-practice guidelines are integrated into the referring physician's workflow. When physicians request a diagnostic exam, the decision-support tool asks the referring physician for the patient's symptoms and then recommends whether diagnostic imaging is appropriate and, if so, which scan should be performed.

Electronic medical records

Simply put, *electronic medical records* (EMRs) allow the patient care team within a specific clinic or doctor's office to access patient health information (including lab results and specialist consultations) on-line. Depending on the system used by the physician or clinic, the EMR may include clinical decision support and administrative tools for billing and office management.

While the use of EMRs in Canada is still relatively rare, the push is on to bring EMRs to all primary health care practices in Canada. (Figure 11) According to the *2007 National Physician Survey*, the use of computers by family doctors is often confined to administrative rather than clinical functions. Survey results showed that just over half (56%) of family physicians used electronic billing and about 43% scheduled appointments electronically. Only 13% used electronic systems that included prompts about potential drug interactions and/or reminders for recommended patient care.

The CMA has called for EMRs to be installed in every physician's office by 2011.[60] Governments have committed funding for the adoption of EMRs. British Columbia, Alberta, Saskatchewan, Ontario, and Nova Scotia have established support programs to help physicians make the transition from paper to electronic records.[61] Other jurisdictions are moving to develop similar programs with support from *Infoway*. *Infoway* investments are also supporting the efforts to integrate the electronic health record (EHR) and the EHR system in a way that would allow the EHR to contribute to, and draw information from, the more comprehensive EHR.

C. ELECTRONIC HEALTH RECORDS

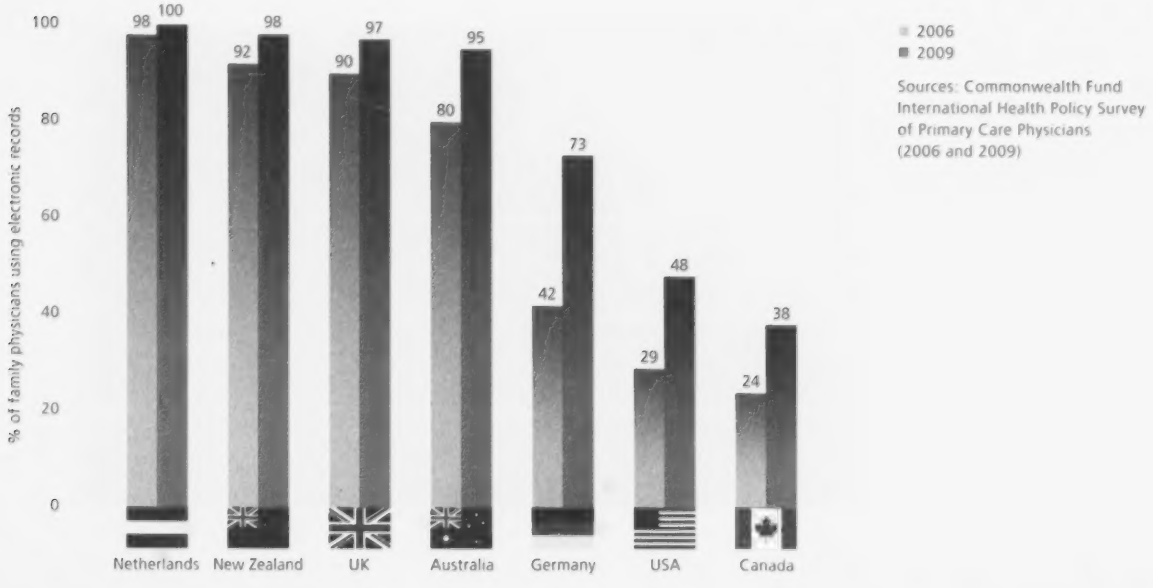
An *electronic health record* (EHR) is a secure, digital record of a patient's medical history that is shared through a network that can link information from different locations, such as hospitals, labs, pharmacies, public health clinics, and doctors' offices. When implemented across Canada, EHRs will give physicians easy access to comprehensive information about their patients (including lab and diagnostic imaging results) and will help them, for example, better manage chronic conditions and prescribe medications electronically directly to pharmacists.[38]

In 2000, First Ministers committed to making the development of an "interoperable electronic health record" a top priority. In 2001, *Infoway* was given the mandate to build the foundation for a system that would electronically connect all aspects of patients' health records and would be accessible and used by health care professionals across the country. The 2003 and 2004 Health Accords

FIGURE 11

Canadian Doctors Continue to Rank Last in Use of EMR Compared to Other Countries

More than one-third (38%) of Canadian family physicians reported using EMRs in 2009, up from 24% in 2006.



reinforced this commitment in the context of addressing concerns about the rising costs of health care, constraints in health human resources, and an aging population whose need for complex care is increasing.

Infoway estimates that completing Canada's EHR could take between ten and 15 years, based on the experience of other countries and industries in building technological infrastructures to serve their clients. As discussed in this report, *Infoway* along with the provinces and territories is making steady progress towards making electronic records available to all Canadians by 2016.[38]

Significant investments have been made by the federal government and jurisdictions to achieve these goals. It is estimated by *Infoway* that the cost of developing an EHR for all Canadians is in the range of $10 billion. However, the annual savings and efficiencies are estimated to be more than $6 billion annually once fully implemented.[38]

Electronic health records are an important tool to address data gaps. Also through secondary use of data, researchers will be able to answer questions related to health outcomes. For example, because EHRs integrate information about all aspects of a patient's health care use, physicians and researchers will be able to link data on drug use to data demonstrating the benefits (or lack thereof) for individuals, the population, and the health care system.

D. PERFORMANCE FEEDBACK

Performance feedback is the process of collecting information from family physicians about their patients and treatment decisions, and then reporting back to them about their practice patterns, usually in comparison to their peers or to clinical guidelines. The aim is to improve appropriateness of care by informing physicians about their clinical behaviour and how it compares to practices of other physicians or accepted standards of care.

Systematic reviews have found that performance reporting can influence small to moderate improvements in the quality of care, though the impact is variable.[62] Some promising practices offer substantial benefits at relatively low cost. For example, in one Ontario study, giving physicians feedback and educational materials about prescribing every two months increased the use of the appropriate antibiotics and kept the cost of the medication down.[63]

Family physicians receive formal performance feedback through peer review systems conducted by the regulatory college in their jurisdiction. While important, these programs may be infrequent (e.g. every five to seven years),[64] and are not designed for day-to-day performance feedback and quality improvement. Instead, frequent performance feedback with an eye towards quality improvement may have more impact on physician practice patterns and decision making.

One-third of Canadian physicians who responded to the 2009 Commonwealth Fund survey indicated that areas of clinical performance are reviewed against targets at least annually. Fewer physicians (17%) reported that the place where they practice routinely receives and reviews data on aspects of patient care, such as clinical outcomes. (Figure 12)

Canada's low rankings may be related to the low uptake of EMRs among Canadian family physicians, because electronic access to patient information is "generally needed to participate effectively in quality improvement initiatives."[65] The largely paper-based system still used in Canada limits physicians' ability to participate in and benefit from performance feedback opportunities.

Primary health care – voluntary reporting system

In response to the need to provide family doctors and other primary health care (PHC) team members with more and better primary health care data and information, the Canadian Institute for Health Information (CIHI) has embarked on a multi-year prototype Voluntary Reporting System (PHC VRS). Since 2009, CIHI has worked with a pilot group of PHC clinicians on a voluntary basis across Canada to collect a subset of de-identified data from electronic medical records in order to achieve the following four goals:

1) Help participating PHC clinicians to understand and improve the quality of care delivered in their practice by providing quarterly comparative provider feedback reports in areas such as practice demographics, health system utilization, and quality of care indicators;
2) Provide a collaborative forum that supports PHC clinicians in quality improvement and EMR learnings;
3) Provide new information and understanding in priority areas to support better health system management; and
4) Provide new insights on how to make PHC EMRs more useful for PHC clinicians and quality improvement.

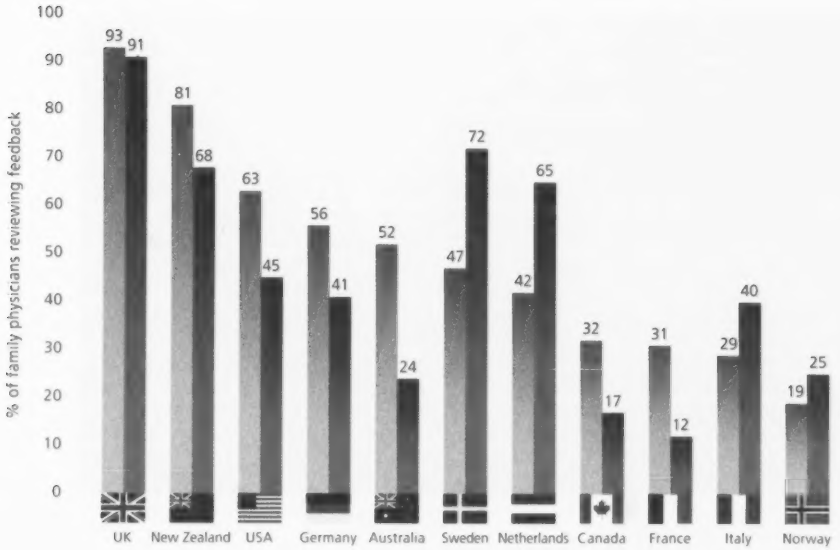
In the years ahead, the number of participating PHC VRS sites and jurisdictions is expected to increase, resulting in an even richer PHC data source capable of providing more robust comparative measures and additional indicators for family doctors and other PHC clinicians.

For more information refer to www.cihi.ca/phc

FIGURE 12

Canadian Doctors Rank Among the Lowest in Clinical Performance Feedback Review Compared to Other Countries

One third of Canadian family physicians reported that their practices reviewed clinical performance targets at least annually. Even fewer reported reviewing information on their patients' clinical outcomes.



Percentage of physicians who indicated "yes" to the following questions:

- Are any areas of clinical performance reviewed against targets at least annually?
- Does the place where you practice routinely receive and review data on the following aspects of your patients' care? Clinical outcomes (e.g., percent of diabetics or asthmatics with good control).

Source: Commonwealth Fund International Health Policy Survey of Primary Care Physicians (2009)

Clinical practice guidelines, peer review protocols, and reports to illustrate where doctors stand in relation to their peers have been developed and are used to varying degrees across the country.

IN SUMMARY

Studies have found that the gap between research and practice is challenging due to a variety of reasons. While national surveys indicate that access to clinical practice guidelines is not difficult, use of the guidelines, or integrating guidelines into clinical practice, is an area for improvement. Further investigation into suggestions for removing barriers to implementation and use of clinical practice guidelines is warranted. This may be particularly relevant in the area of diagnostic imaging where technology is rapidly changing and referrals are no longer limited to specialists.

Tools have been developed to monitor who is ordering tests – which tests, how many, and for which type of patients. Clinical practice guidelines, peer review protocols, and reports to illustrate where doctors stand in relation to their peers have been developed and are used to varying degrees across the country.

Data that are currently publicly available in Canada to understand the value of drug use is limited. Existing data provide information about how many patients have been prescribed certain drugs, but we cannot connect this information to health outcomes at the national level. We simply don't know why patients received their prescriptions, or whether their health improved or worsened after taking the medication.

Implementation of electronic health records will facilitate the use of health technology assessments, performance standards, and clinical-decision support tools including evidence-based clinical practice guidelines. Use of these tools needs to be made commonplace, and providers held accountable for their use in the interest of good medicine and cost-effective care.

Data Sources

National Physician Survey

The National Physician Survey (NPS) is Canada's largest survey of physicians and surgeons. Administered every three years by the Canadian Medical Association, the College of Family Physicians of Canada, and the Royal College of Physicians and Surgeons of Canada, it reaches all physicians in Canada.

The NPS covers a variety of topics, ranging from the allocation of physicians' time, to the use of health information technology, to their future plans (whether they will increase or decrease their work hours, relocate their practice, or change the mix of services they offer to patients). Of the 60,811 physicians currently working in Canada for whom valid addresses existed, 19,239 physicians responded (31.64% response rate) to the 2007 NPS survey.

More information about this survey is available at *www.nationalphysiciansurvey.ca.*

Commonwealth Fund International Health Policy Survey

Each year the Commonwealth Fund, a US-based organization, conducts an international survey on a major health policy issue. Canada, along with about 10 other countries, participates in the survey each year. The Health Council of Canada has co-sponsored this survey from 2007 to 2010 in order to increase the sample for Canada. Depending on the focus of the survey, Canadians and/or primary care physicians who practice in Canada are contacted by phone or mail, to provide survey responses.

For this report, we used data from the 2006 and 2009 surveys of primary care physicians, as well as data from the 2007 survey of adults from the general population.

The 2006 survey of primary care physicians included responses from seven countries (Australia, Canada, Germany, Netherlands, New Zealand, UK, USA). The 2009 survey of primary care physicians included responses from 11 countries (Australia, Canada, France, Germany, Italy, Netherlands, New Zealand, Norway, Sweden, UK, USA). The physician surveys asked doctors about access to their services, use of electronic records, involvement in interprofessional teams, especially in relation to chronic disease management, and quality of care.

The 2007 survey of the general population asked about their experiences with health care and the quality of health care they received. Results included responses from seven countries (Australia, Canada, Germany, Netherlands, New Zealand, UK, USA).

More information about this survey is available at *www.cmwf.org.*

National Survey of Selected Medical Imaging Equipment

This survey has been conducted by the Canadian Institute for Health Information (CIHI) annually since 2003 (except 2008). The survey tracks information about medical imaging equipment installed and in operation in Canadian hospitals and free-standing imaging facilities as of January 1 of each year. The 2009 survey collected information on CT scanners, MRI scanners, nuclear medicine cameras (gamma and SPECT), PET, PET/CT, and SPECT/CT scanners.

More information about this survey is available at *www.cihi.ca.*

IMS Health

IMS Health provides market intelligence and health information to pharmaceutical and health care industries worldwide. For this report, we used previously published IMS Health data, and data based on analyses completed by IMS Health specifically for use in this report. Findings are based on data from 2005 to 2009 and from a variety of IMS Health's databases, as described below.

The Canadian Drug Store and Hospital Purchases Audit (CDH) measures the dollar value and unit volume of pharmaceutical and diagnostic products purchased by Canadian retail pharmacy outlets and hospitals. Data for CDH are collected from a representative sample of 2,200 drugstores and 640 hospitals and long-term care facilities. The sample data are then projected to reflect estimates of purchases in drugstores and hospitals, across Canada.

The Canadian CompuScript Audit measures the number of prescriptions dispensed by Canadian retail pharmacies. Product information is presented according to therapeutic class, and for each product the following data elements are collected: manufacturer, form, strength, new vs. refill prescription, prescription size and price, transaction location, transaction date, MD number (if available), third-party payer (if available), and authorized repeats. The *CompuScript* sample is drawn from IMS's panel of over 5,700 pharmacies, which represents more than 70% of all retail pharmacies in Canada; over 5,200 stores are used for the audit including chain and independent pharmacies. Sample data collected are then used to project estimates for each province and provincial totals are added together to provide a national estimate.

LRx is a longitudinal patient de-identified database. It takes data from slightly over 16 million patients in Canada, which is 50% of the population. The data is obtained from the information used to dispense a prescription, and is obtained from pharmacies in every province in Canada. The data contains information on patient demographics and on the type, strength, and regimen of the medication. The longitudinal nature of the data allows the tracking of patient cohorts over time.

The Canadian Disease and Therapeutic Index (CDTI) collects treatment data from a sample of 652 office-based Canadian physicians which includes both family physicians and specialists from the Maritimes, Quebec, Ontario, the Prairies, and British Columbia. CDTI identifies drug usage and treatment patterns by drug and by physician specialty and includes information about diagnosis and treatment trends, patient demographics, and untreated conditions. Statistical research has verified that the mix of physicians represents the physician population and sample data is used to project estimates of the population.

It should be noted that in this report we refer to the term "number of prescriptions." Any comparisons of "number of prescriptions" should be made with caution. This is because the same drug could be dispensed for a range of durations – one week, one month, three months, or other. The number of prescriptions represents the number of times a prescription is filled at a pharmacy, including refills.

More information on IMS Health is available at *www.imshealth.com*.

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ACKNOWLEDGEMENTS

The Health Council of Canada gratefully acknowledges the significant efforts by numerous people in the federal, provincial, and territorial ministries of health, in various agencies, and on the front lines of health care, who participated in interviews and responded to our requests for information and feedback for this report. Agencies that we consulted included the Canadian Association of Radiologists, Canada Health Infoway, the Canadian Institute for Health Information, the Canadian Medical Association, and the College of Family Physicians of Canada.

Development of this report was led by the Council's Health Services Utilization Working Group, which included Councillors Albert Fogarty, Dr. Danielle Martin and Verda Petry, as well as external advisors, Nancy Ross, Wayne Strelioff, Dr. Anthony Culyer and Louise Jones. The Council also thanks Dr. Steve Morgan (UBC Centre for Health Services and Policy Research), Dr. Neil MacKinnon (Dalhousie University), John McGurran (University of Toronto), and Adele Fifield (CEO, Canadian Association of Radiologists) for their contributions.

The Council thanks the Secretariat staff for their work in supporting the research, analysis and production of this report.

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The Health Council of Canada would like to acknowledge funding support from Health Canada. The views expressed here do not necessarily represent the views of Health Canada.

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Decisions, Decisions: Family Doctors as Gatekeepers to Prescription Drugs and Diagnostic Imaging in Canada
September 2010
ISBN 978-1-897463-80-2 PDF
ISBN 978-1-897463-81-9 Print

How to cite this publication:
Decisions, Decisions: Family Doctors as Gatekeepers to Prescription Drugs and Diagnostic Imaging in Canada. Health Council of Canada. (2010). Toronto: Health Council. www.healthcouncilcanada.ca.

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